National Highway Traffic Safety Administration Technical Assistance Program Statewide EMS Re-Assessment

Attachment 28

2015 Enhanced 911 Annual Report

IOWA DEPARTMENT OF HOMELAND SECURITY & EMERGENCY MANAGEMENT

Enhanced 911 Annual Report

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January 15, 2015

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Introduction

The Iowa Department of Homeland Security and Emergency Management (HSEMD) submits this Enhanced 911 (E911) annual report to the General Assembly's standing committees on government oversight pursuant to Iowa Code § 34A.7A (3) (a). This section of the Code requires the E911 program manager to advise the General Assembly of the status of E911 wireline and wireless implementation and operations, the distribution of surcharge receipts, and an accounting of revenue and expenses of the E911 program.

The State's E911 system consists of 115 public safety answering points (PSAP) across 99 counties that handle both landline and wireless 911 calls for the citizens of Iowa who make emergency calls. The wireline 911 system was started in Iowa in 1988, originally codified in Iowa Code Chapter 34, and is managed and financed by local 911 service boards through local funding and a landline surcharge system under Iowa Code Chapter 34A. The wireless system was added to the system in 1998, funded through a wireless surcharge on monthly users' bills, and managed by the Iowa Department of Homeland Security and Emergency Management under Chapter 34A.

The wireless portion of the 911 system is currently undergoing a significant upgrade to an IP-based system. The first phase of what is called the next generation 911 network has converted analog trunking to the local PSAPs to a statewide IP-based Ethernet network. This upgrade was completed in November of 2012. The second phase of the network upgrade is currently in progress and includes moving and upgrading the network's data centers to ensure greater redundancy. Individual PSAP equipment is also being upgraded to IP-enabled call-handling equipment. When completed, this upgrade will allow PSAPs to receive IP-based signaling for the delivery of emergency calls that include text, video, and picture messaging. Callers will be able to text emergency messages to select PSAPs within the next few months. The system improvements also include improved GIS mapping and database and address reconciliation to improve the automatic location services. When completed, this will allow a dispatcher to pinpoint the caller on recent GIS imagery of the geographical area the PSAP covers.

Local 911 service boards are responsible for the implementation of these equipment upgrades with funding provided by the E911 carryover fund. Sixty-seven of the 115 PSAPs have been updated as of December 31, 2014, and the upgrade program should be completed by December 31, 2015.

Chapter 34A of the Code of Iowa requires that each county in the state establish the joint enhanced 911 service board that has authority over the local PSAP. Each board has the responsibility to develop a countywide E911 service plan, detailing the manner and cost for the implementation of a wireline and wireless E911 system for the PSAP geographical area. However, the overall operation of the PSAP is left to the joint county service boards. As of today, all 99 counties have approved enhanced E911 service plans.

The Iowa Department of Homeland Security and Emergency Management has the responsibility to review and approve the countywide E911 service plans. HSEMD is also responsible for the overall administration of Chapter 34A through a program administrator appointment by the HSEMD director.

History of Iowa 911

The Iowa 911 system got its start in 1986 when the Iowa General Assembly passed a law that created a 29-member State Emergency Telephone Number Commission that was directed to study the issue of statewide implementation of 911 services. The Commission issued its report in January 1987 and the legislative language contained in the report was introduced as House File 2400. House File 2400 was passed by the General Assembly and was signed into law by Governor Branstad on May 6, 1988. It was this law that set out the basic wireline 911 system in Iowa in Iowa Code Chapter 34 that is currently codified in Chapter 34A.

In 1996, the Federal Communications Commission (FCC) mandated that wireless 911 service be put in place and function similarly to the wireline 911 that Iowa had in place. The 1998 General Assembly amended Code of Iowa Chapter 34A in response to the FCC action to include wireless 911 services.

The state's initial 911 wireline system only directed callers dialing 911 to the local PSAP; it didn't include information about the caller to the 911 dispatcher nor did it require specific routing information to ensure that the call arrived at the correct PSAP. In 1989 the General Assembly encouraged local 911 service boards to include enhanced services dealing with the location of the person making the 911 call as part of their 911 service plan.

To meet the requirements of an enhanced 911 system set out in Iowa Code § 34A.2 (7), the system must be capable of automatically providing voice, displaying the name, address of location, and the telephone number of the incoming 911 call. The system must also be able to route the incoming call to the PSAP that corresponds to physical location of the caller. Currently, all landline 911 services in Iowa meet the enhanced definition.

With respect to wireless calls, the transition to enhanced services was a two-step process. Phase one of the transition to enhanced wireless 911, as set out in Iowa Code § 34A.2 (19), requires the system to display to the dispatcher the call-back number of the caller and the cell tower that received the call and transmitted it to the PSAP. Phase two of the transition, described in subsection 20, requires the cell company to provide the call-back number plus the latitude and longitude of the caller so that the call and address information can be tied to GIS imagery information. Since December 31, 2007, all 115 PSAPs in all 99 counties have accepted enhanced Phase two calls from the wireless service providers.

On July 8, 2011, the State of Iowa hired TeleCommunication Systems, Inc., (TCS) to begin the development and implementation of the next phase of Iowa's enhanced 911 system: the implementation of a statewide, IP-enabled, or next generation, 911 system that at its heart is digital rather than analog.

As part of this five-year $4.4 million contract, TCS is responsible for the design, programming, installation and maintenance of all components of the wireless 911 backbone and the delivery of both wireline and wireless 911 calls. TCS is currently in the third year of its five-year contract for the system upgrade.

Current Status of E911 System

The current 911 system operating in Iowa is an enhanced 911 system that is transitioning to a next generation system. As an enhanced 911 system it can give the automatic address or location data and routing capabilities that an enhanced 911 system allows. As a next generation system it is IP or Internet-based rather than an analog system.

Iowa's enhanced 911 system is composed of two calling systems that both lead to the local PSAP dispatcher—the landline system and the wireless system. Although the 911 system started as a landline system in 1988, as the use of cell phones increased, the wireless portion of the system has grown to the extent that currently some 70 percent of the calls to local PSAPs come over the wireless system.

Wireline 911

The wireline system has been developed and implemented by the local Joint E911 Service Boards. As such, the system is comprised of a variety of differing network elements. This has led to a system of disparate 911 networks. These networks include direct trunking to the PSAP, locally selectively routed calls and regionally selectively routed calls. Trunk-based legacy systems are only capable of delivering wireline 911 calls.

Wireless 911

With advances in technology and the evolving use of wireless cell phones, a new network system was needed to allow for the transmission of 911 wireless calls. Beginning in 1998, HSEMD began the process of deploying a statewide wireless 911 network. This network was comprised of a single selective router that connected all PSAPs in Iowa.

As technology further evolved from a cell phone to a smartphone with enhanced capabilities, HSEMD recognized the desire of the public to use these enhanced capabilities to communicate with public safety agencies. These new capabilities include text, picture, and video. Thus HSEMD began the migration from an analog-based system to an IP-enabled next generation system.

Initial deployment of the next generation wireless 911 system had most of the 115 PSAPs connected to the 911 data centers using multiple carriers. Managing multiple carriers completed the connectivity, but had the inherent obstacles of increased potential for failure, duration of outages, and higher recurring costs. To minimize these obstacles, HSEMD has worked to establish a direct connection from each PSAP to the wireless 911 system. The Iowa Communications Network (ICN) was able to correct this by providing a direct circuit. The process of connecting PSAPs to the ICN has been underway for the past four years and by the end of 2015 all but one of the 115 PSAPs should be directly connected to the ICN, decreasing the potential for failure and costs.

The core wireless 911 network includes two redundant data centers connected by two 50 Mb circuits to handle the call volume and call routing. Data centers receive incoming 911 calls directly from the wireless carriers and route the calls based on the location of the caller to the corresponding PSAP. If a call is received at one data center and it is unable to process the call, it will be automatically rerouted to the other data center.

The two data centers are currently located in Newton and West Des Moines. To provide geo-diversity between the two data centers, and because the

Current Status of E911 System

Newton location will be closing in 2015, HSEMD will relocate the data center in Newton to Davenport. Installation and testing of the PSAP equipment will begin in January 2015. The Newton location will be operational until all the installation and testing is complete and all wireless carriers have migrated their circuits to the new location. Once the Davenport location is operational, the Newton location will be decommissioned.

The Iowa Department of Homeland Security and Emergency Management has upgraded the wireless 911 network backbone to support the next generation 911 (NG911) emergency services IP-based system. The upgrade to a NG911 network will support the use of text, video, and picture messaging to access emergency care via 911 once these services become available from the wireless carriers. As of November 2, 2012, all 115 PSAPs have been migrated to the new next generation 911 network.

The Iowa Department of Homeland Security and Emergency Management plans to begin deploying text to 911 in April 2015 to counties that have completed necessary upgrades and are able to utilize this technology. Once the PSAPs complete the necessary equipment upgrades and training, HSEMD will submit the requests to the wireless carriers to provide text–to-911 services to identified counties.

Geographic Information Systems and NG911

Geographic Information Systems (GIS) technology provides the critical data backbone of the NG911 network and is a key component for call routing, call handling, call delivery, location validation and emergency response. Data from the GIS also provides dispatchers and responders access to more information such as location, details about the caller, and additional information to include the caller's service provider or telematics. Information sharing is essential to building statewide GIS datasets, as more than 100 different data owners need to share information for the NG911 system. HSEMD has budgeted some $15,741,664 over the next six years to support data maintenance and creation, hardware and software, and aerial imagery needed to complete and maintain the GIS component of the NG911 system.

HSEMD has contracted with Geo-Comm Inc., to assist in developing the statewide E911 GIS standards. There have been five educational seminars held with the PSAPs, city and county GIS partners, and public safety stakeholders to provide information and gather feedback on the project. A committee of local GIS partners has been established to assist in the development of the standards.

As of December 31, 2014, Geo-Comm Inc. has completed 64 assessments and provided the data analysis reports to the counties. A final report to the Iowa Department of Homeland Security and Emergency Management is due by February 5, 2015, and will include the data analysis report for each county, the statewide NG911 GIS standard, and recommendations of next steps for continuing on the critical path to NG911 GIS completion.

Local PSAP Upgrades to NG911

The call handling equipment at each PSAP must also be upgraded to meet the NG911 standards. Local 911 service boards are responsible for the implementation of these equipment upgrades with funding provided by the E911 carryover fund. Sixty-seven of the 115 PSAPs have been updated as of December 31, 2014, and the upgrade program should be completed by December 31, 2015.

Current Status of E911 System

Attachment 1 of this report describes the progress made by local PSAPs in upgrading their call handling equipment. The deadline for PSAP equipment upgrades to IP-enabled equipment is December 31, 2015.

The transition to an IP or digitally-based 911 system has made it possible to receive 911 calls at any location, creating the potential for so-called virtual PSAPs. This improvement has allowed PSAPs to share the expense of 911 call processing equipment. For example, in south central Iowa, a consortium of seven counties has joined together to provide E911 services. By using NG911 equipment, the seven counties now use only three sets of call processing equipment without changing how they interact with 911 callers. By sharing call processing equipment, the seven counties saved some $400,000 in upgrade equipment costs.

To support these initiatives within the wireless network, HSEMD has projected the costs required to put in place all the elements described earlier in this section. As detailed in Attachment 2, HSEMD will be able to fully deploy the NG911 network to include network redundancy, GIS database development and maintenance and local PSAP equipment upgrades while maintaining a solid financial foundation for the entire program.

This process will increase the survivability of the wireless 911 network while also allowing state and local responders to fully leverage and utilize the statewide next generation 911 system for present technology as while also being positioned to effectively utilize future improvements.

Subscriber Surcharges and Distribution

Funding for the wireline and wireless portion of the E911 system are set out in Iowa Code §§ 34A.7 and 34A.7A, respectively. The surcharge for both wireline and wireless 911 services was set at $1 per month per access line across the entire state in July 2013 by the General Assembly. The wireline surcharge attached to landline subscribers' bills is deposited in the local E911 service fund and disbursements are made by the joint E911 service board. The wireless surcharge is deposited in the State E911 Emergency Communication Fund administered by HSEMD.

As of December 31, 2014, service boards in all 99 counties were collecting wireline surcharges at the rate of $1 per month. For the 12 months ending September 30, 2014, the wireless surcharges totaled $27,283,315.35. In fiscal year 2014 the total of wireline surcharges was a projected $11,834,577.

The Iowa Department of Homeland Security and Emergency Management has the responsibility to order the implementation of the surcharge with each telephone service provider who provides service within the E911 service area. Within the state, there are 295 incumbent and competitive local exchange service providers. Each local telephone service provider remits collected surcharge funds directly to the respective joint E911 service board on a quarterly basis.

Prepaid Wireless and VoIP Surcharges

In 2012 Iowa Code § 34A.7B authorized a surcharge on prepaid wireless phone transactions in the amount of 33 cents per prepaid transaction occurring in the state of Iowa. The prepaid surcharge is remitted to the Iowa Department of Revenue which transfers all remitted prepaid wireless 911 surcharges to the state treasurer for deposit in the E911 Emergency Communications Surcharge fund. In 2013 Iowa Code §34A.7A was amended to allow the prepaid wireless surcharge to increase or decrease proportionately to the wireless surcharge. As a result of that change the prepaid surcharge is currently 51 cents per prepaid transaction and the total revenue generated for this surcharge in 2014 is approximately $1,706,903.86.

In 2012 the definition of communication service provider in Iowa Code §34A.2 was amended to service providers that transported information over the Internet, including voice over Internet protocol (VoIP) companies, which are now required to collect and remit surcharges as a communications service provider.

Cable TV companies that sell VoIP services as part of a bundled package pay their collected surcharges to the local wireline E911 service board. The VoIP providers, such as Vonage, that are not restricted to a particular location, pay the surcharges assessed to their customers to the state E911 emergency communication fund.

Wireless Surcharge Distribution

The bulk of the E911 surcharge revenue obtained is through the wireless surcharge. Under Iowa Code §34A.7A (2), the collected surcharges must be distributed in the following order:

1. To Homeland Security and Emergency Management for program administration, an amount equal to that appropriated by the General Assembly. In fiscal year 2015 this amount was $250,000.

Subscriber Surcharges and Distribution

2. To wireless service providers, 13 percent of surcharge funds generated for the three-year period of July 1, 2013, through June 30, 2016, to recover their costs of providing E911 wireless phase one services. On July 1, 2016, this amount will no longer be distributed to wireless service providers. For the 12 months ending September 30, 2014, this amount was $457,961.94.

3. To communication service providers, wireline carriers for eligible expenses for transport costs of calls between the E911 network routers and the local PSAPs. For the 12 months ending September 30, 2014, this amount was $843,594.86.

4. To wireline carriers and automatic location information database providers, for the costs of maintaining and upgrading E911 components and functionalities including the E911 selective routers and beyond and the costs of maintaining the automatic location information database. For the 12 months ending September 30, 2014, this amount was $1,542,584.57.

5. To joint E911 service boards, 46 percent of the surcharge funds generated for communications equipment utilized in the implementation and maintenance of E911 services within the local PSAP. Iowa Code § 34A.7A (2) (e) (2) (a) – (c) sets out how the 46 percent amount is to be distributed among the 115 PSAPs in the state. For the 12 months ending September 30, 2014, this amount was $12,697,540.18.

E911 System Metrics

Attachment 3 to this report shows a map of PSAP locations.

Attachment 4 to this report shows the relationship among the annual volume of wireless calls received by PSAP counties, the annual wireless surcharge payment made to those counties, and the resulting cost per call for the period October 1, 2013, to September 30, 2014.

As indicated in Attachment 4, the annual cost per wireless call ranges from a low of $6.08 per call in Polk County to a high of $142.98 per call in Ringgold County. The median cost per call is $38.10. The number of calls to a PSAP per month ranges from a low in Audubon County of 41 calls per month to a high in Polk County of 14,155 calls per month, with the median monthly wireless call volume of 214 calls per month.

Iowa Code §34A.7A (5) (a) required the E911 program manager to establish a methodology for determining the actual costs to operate a PSAP and begin collecting data concerning the actual costs by January 1, 2014. HSEMD is now collecting that data with the cooperation of the local PSAP and will submit a report on those costs to the General Assembly by March 1, 2016. The purpose of the cost report is to assist the General Assembly in determining whether the E911 surcharges and other funding sources are sufficient to fund the actual costs of the E911 system.

Attachment 1 shows the PSAPs that have upgraded equipment to current standards, funds spent at the PSAP for 2014, and PSAPs that are now technologically capable of receiving text-to-911messages. PSAPs that are currently showing no equipment upgrades or funds obligated on Attachment 1 still have time to complete the upgrades. A few PSAPs are moving to new locations and are waiting to complete the upgrades once relocated to their new location. Other PSAPs had immediate equipment needs for items that had failed over the course of the previous year. HSEMD's 911 staff will begin working with those counties to assist them in the process to complete their equipment upgrades by the deadline.

Attachment 5 shows an accounting of income and expenses for the twelve months ending September 30, 2014.

Attachment 2 shows a five-year cost projection to support efforts to increase the survivability of the wireless 911 network by provisioning a limited secondary network and relocating a data center to ensure geographic diversity. These projections also include development of a GIS-based 911 database that will allow state and local responders to fully leverage and utilize the statewide next generation 911 system.

Attachment 6 details the cost savings achieved in moving from the legacy system to an IP-enabled next generation 911 system utilizing the ICN.

Conclusion

Advancements in technology have enabled the use of these technologies to provide more accurate, timely, redundant systems that enable citizens to contact 911 in order to get much needed life-saving resources. The GIS enhancement of the 911 system uses common data that can be shared seamlessly from PSAP to PSAP to more effectively and accurately dispatch resources to the impacted caller's location. GIS will no longer be constrained by service areas and state lines.

Much of the infrastructure used to support the 911 system can also be utilized to reach out to the public through wireline and wireless capabilities to provide critical warning and life safety information. Another initiative Iowa has undertaken is a statewide alerting system that can utilize GIS information to alert citizens in a defined polygon area. The GIS information gathered as part of the 911 system would greatly enhance this critical public alerting capability.

The Iowa Department of Homeland Security and Emergency Management will continue to work hand in hand with the Statewide 911 Communications Council, the Iowa Utilities Board, the Iowa Telecommunications Association, the Iowa Statewide Interoperable Communications System Board, and Local 911 Service Boards to maintain and improve the level of 911 services within the state.

For More Information

Learn more about Iowa's E911 program at the Iowa Department of Homeland Security and Emergency Management's website:

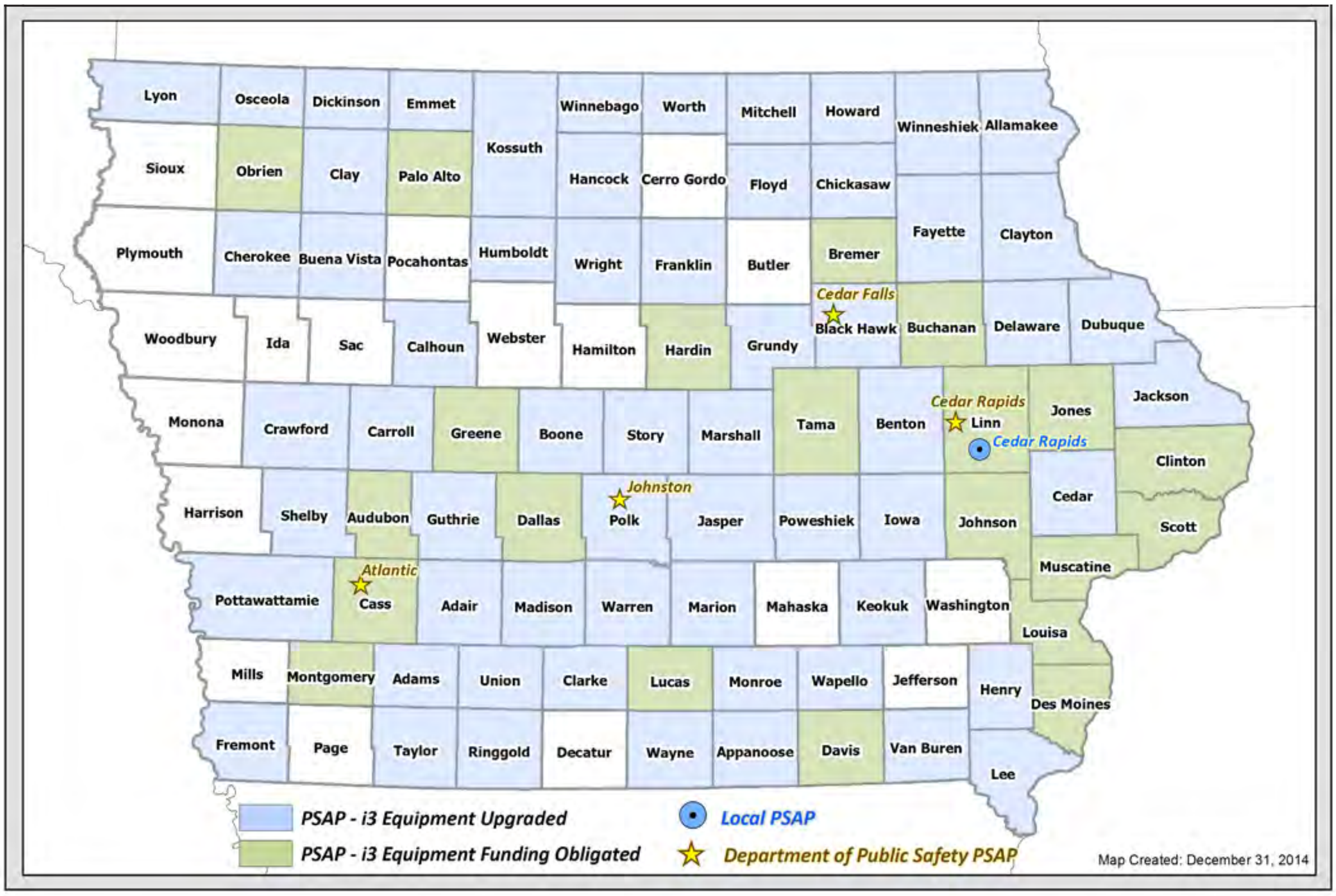
www.homelandsecurity.iowa.gov

Inquiries may directed to the E911 program administrator at 515.725.3231.

Attachment 1

Map of Ugraded Public Safety Answering Points

Equipment Upgraded to i3/Funding Obligated for i3 Upgrade



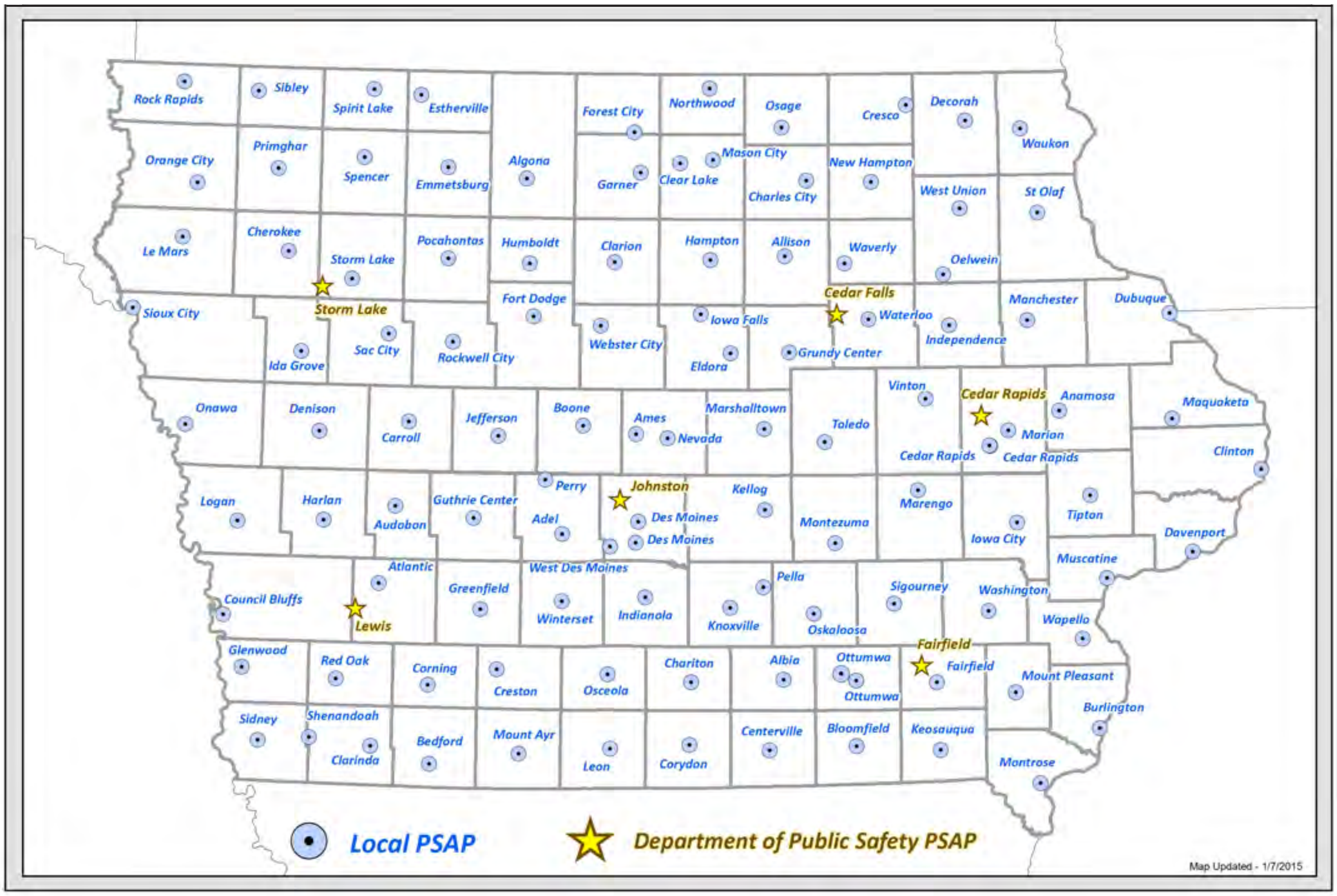
Attachment 2

Revenues and Expenditures Projection

46% PSAP pass through, $11.5 million a year Expended from Carryover for PSAP and E911 system improvements						
	Projections					
Revenue	**FY2015**	**FY2016**	**FY2017**	**FY2018**	**FY2019**	**FY2020**
Surcharge Collected	$26,000,000.00	$26,000,000.00	$26,000,000.00	$26,000,000.00	$26,000,000.00	$26,000,000.00
Prepaid Wireless	$2,000,000.00	$2,000,000.00	$2,000,000.00	$2,000,000.00	$2,000,000.00	$2,000,000.00
Interest	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00	$45,000.00
Carryover brought forward	$21,045,807.00	$11,010,907.00	$7,906,740.33	$5,362,573.66	$2,818,406.99	$274,240.32
	$49,090,807.00	**$39,055,907.00**	**$35,951,740.33**	**$33,407,573.66**	**$30,863,406.99**	**$28,319,240.32**
Expenditures						
HSEMD	$250,000.00	$250,000.00	$250,000.00	$250,000.00	$250,000.00	$250,000.00
Wireless Service Providers	$560,000.00	$560,000.00	$0.00	$0.00	$0.00	$0.00
Network transport	$2,400,000.00	$2,400,000.00	$2,400,000.00	$2,400,000.00	$2,400,000.00	$2,400,000.00
PSAP	$12,700,000.00	$12,700,000.00	$12,700,000.00	$12,700,000.00	$12,700,000.00	$12,700,000.00
Carryover Applications-Funds Obligated/Expended	$11,500,000.00	$11,500,000.00	$11,500,000.00	$11,500,000.00	$11,500,000.00	$9,230,073.65
	$27,410,000.00	**$27,410,000.00**	**$26,850,000.00**	**$26,850,000.00**	**$26,850,000.00**	**$24,580,073.65**
NG911 Future Enhancements						
Newton Data Center Move-equipment/installation/engineering (NRC)	$2,000,000.00					
WDM Data Center upgrade equipment/installation/engineering (NRC)	$2,000,000.00					
GIS PSAP Data Maintenance (Annually)	$1,115,000.00	$1,115,000.00	$1,115,000.00	$1,115,000.00	$1,115,000.00	$1,115,000.00
GIS Data Services and portal (year one)	$1,500,000.00					
GIS Data Services and portal (Annual cost)		$1,000,000.00	$1,000,000.00	$1,000,000.00	$1,000,000.00	$1,000,000.00
HSEMD on site backup servers and data	$40,000.00	$40,000.00	$40,000.00	$40,000.00	$40,000.00	$40,000.00
Statewide Imagery Service (Immediate Service)	$1,000,000.00					
Imagery Acquisition (1st collection years 1-3)		$866,666.67	$866,666.67	$866,666.67		
Imagery Acquisition (2nd collection years 4-6)					$866,666.67	$866,666.67
Secondary ESInet (Annually)	$200,000.00	$200,000.00	$200,000.00	$200,000.00	$200,000.00	$200,000.00
Secondary ESInet (NRC)	$319,800.00					
ICN Fiber Installs to remaining seven PSAPs	$1,803,600.00					
Text to 911 TCS Emedia (Annually)	$517,500.00	$517,500.00	$517,500.00	$517,500.00	$517,500.00	$517,500.00
Text to 911 TCS Emedia (NRC)	$174,000.00					
Projected Future Network Expenses	**$10,669,900.00**	**$3,739,166.67**	**$3,739,166.67**	**$3,739,166.67**	**$3,739,166.67**	**$3,739,166.67**
Starting Carryover Fund		2016 Projection	2017 Projection	2018 Projection	2019 Projection	2020 Projection
$21,045,807.00	$11,010,907.00	$7,906,740.33	$5,362,573.66	$2,818,406.99	$274,240.32	$0.00

Attachment 3

Iowa's Public Safety Answering Points



Attachment 4

Annual Wireless Call Volume and Cost Per Call

County	Annual Number of Calls	Annual Payment	Yearly cost per call
Polk	169,864	$1,033,165.38	$ 6.08
Scott	84,554	$533,500.27	$ 6.31
Linn	61,240	$449,521.30	$ 7.34
Black Hawk	40,485	$307,810.80	$ 7.60
Johnson	33,304	$275,177.24	$ 8.26
Pottawattamie	38,753	$351,809.58	$ 9.08
Woodbury	34,805	$318,578.50	$ 9.15
Dubuque	19,138	$196,522.22	$ 10.27
Des Moines	12,511	$133,136.07	$ 10.64
Story	15,640	$175,284.85	$ 11.21
Muscatine	10,770	$126,470.32	$ 11.74
Wapello	8,885	$118,444.89	$ 13.33
Cerro Gordo	10,795	$148,688.29	$ 13.77
Clinton	11,696	$168,587.95	$ 14.41
Marshall	9,518	$137,399.84	$ 14.44
Warren	9,077	$134,976.27	$ 14.87
Lee	8,436	$126,538.86	$ 15.00
Jasper	9,912	$161,933.16	$ 16.34
Dallas	7,893	$135,191.82	$ 17.13
Webster	8,218	$150,637.01	$ 18.33
Public Safety	1,144	$22,358.52	$ 19.54
Mills	3,732	$86,797.51	$ 23.26
Cedar	4,815	$112,982.13	$ 23.46
Marion	4,857	$115,323.61	$ 23.74
Henry	3,603	$85,588.17	$ 23.75
Poweshiek	4,608	$112,151.35	$ 24.34
Bremer	3,445	$85,252.53	$ 24.75
Boone	4,333	$108,785.51	$ 25.11
Mahaska	4,132	$107,753.33	$ 26.08
Sioux	5,330	$141,847.66	$ 26.61
Dickinson	2,817	$76,319.30	$ 27.09
Iowa	3,771	$107,849.90	$ 28.60
Washington	3,608	$104,686.02	$ 29.01

Attachment 4 (continued)

Annual Wireless Call Volume and Cost Per Call

County	Annual Number of Calls	Annual Payment	Yearly cost per call
Buchanan	3,527	$104,472.47	$ 29.62
Cass	3,350	$102,226.88	$ 30.52
Hamilton	3,404	$104,390.48	$ 30.67
Floyd	2,913	$91,134.41	$ 31.29
Jefferson	2,498	$79,478.43	$ 31.82
Harrison	3,711	$123,558.76	$ 33.30
Jones	2,949	$101,797.54	$ 34.52
Benton	3,620	$125,427.55	$ 34.65
Jackson	3,251	$113,724.57	$ 34.98
Tama	3,524	$125,452.33	$ 35.60
Worth	1,942	$71,604.06	$ 36.87
Buena Vista	2,735	$101,175.12	$ 36.99
Appanoose	2,444	$90,430.10	$ 37.00
Clay	2,602	$99,127.27	$ 38.10
O'Brien	2,563	$99,023.70	$ 38.64
Hardin	2,574	$102,749.16	$ 39.92
Fayette	3,209	$129,052.19	$ 40.22
Louisa	1,777	$72,892.35	$ 41.02
Carroll	2,378	$97,694.67	$ 41.08
Decatur	2,011	$90,535.77	$ 45.02
Franklin	1,964	$89,470.60	$ 45.56
Montgomery	1,542	$72,508.96	$ 47.02
Winnebago	1,401	$68,464.92	$ 48.87
Plymouth	2,899	$142,072.77	$ 49.01
Page	1,908	$94,105.99	$ 49.32
South Central Iowa Regional Board (includes Adair, Adams, Clarke, Guthrie, Madison, Taylor and Union counties)	11,741	$593,449.38	$ 50.55
Delaware	1,856	$96,139.84	$ 51.80
Crawford	2,236	$117,346.50	$ 52.48
Winneshiek	2,142	$113,387.35	$ 52.94
Wright	1,795	$96,234.78	$ 53.61
Clayton	2,393	$129,247.70	$ 54.01

Attachment 4 (continued)

Annual Wireless Call Volume and Cost Per Call

County	Annual Number of Calls	Annual Payment	Yearly cost per call
Emmet	1,256	$67,867.07	$ 54.03
Grundy	1,495	$83,229.92	$ 55.67
Lucas	1,302	$72,517.90	$ 55.70
Lyon	1,704	$96,406.23	$ 56.58
Fremont	1,467	$85,059.37	$ 57.98
Allamakee	1,841	$107,282.59	$ 58.27
Osceola	1,140	$66,693.70	$ 58.50
Monroe	1,206	$71,992.06	$ 59.69
Humboldt	1,191	$72,151.03	$ 60.58
Butler	1,546	$94,676.45	$ 61.24
Chickasaw	1,343	$82,930.96	$ 61.75
Hancock	1,466	$93,083.37	$ 63.49
Shelby	1,467	$95,657.88	$ 65.21
Cherokee	1,409	$93,316.30	$ 66.23
Ida	1,060	$70,908.35	$ 66.89
Howard	1,126	$77,174.72	$ 68.54
Monona	1,500	$111,001.27	$ 74.00
Greene	1,201	$91,325.19	$ 76.04
Keokuk	1,173	$92,418.88	$ 78.79
Calhoun	1,147	$91,174.97	$ 79.49
Van Buren	949	$78,509.88	$ 82.73
Sac	1,082	$91,719.49	$ 84.77
Palo Alto	1,063	$90,340.77	$ 84.99
Mitchell	877	$75,293.03	$ 85.85
Kossuth	1,523	$150,073.43	$ 98.54
Pocahontas	903	$90,791.35	$ 100.54
Wayne	733	$82,536.08	$ 112.60
Davis	692	$79,209.17	$ 114.46
Audubon	495	$69,396.57	$ 140.20
Ringgold	583	$83,355.44	$ 142.98

Attachment 5

Revenues and Expenditures

Revenues	3rd Qtr 2014	2nd Qtr 2014	1st Qtr 2014	4th Qtr 2013	
Surcharge Funds Received	$ 6,625,036.91	$ 6,736,641.23	$ 6,906,736.14	$ 7,014,901.07	$ 27,283,315.35
Interest	$ 11,955.64	$ 13,321.41	$ 9,994.69	$ 9,716.07	$ 44,987.81
Total Revenues					**$ 27,328,303.16**
Expenditures					
HSEMD Funding-used to administer 911 program, i.e. personnel costs, travel, supplies, equipment, Auditor fees for program audits	$ 62,500.00	$ 62,500.00	$ 62,500.00	$ 62,500.00	$ 250,000.00
Wireless Service Providers-cost recovery for wireless Phase 1 services	$ 141,757.28	$ 140,492.22	$ 43,737.22	$ 131,975.22	$ 457,961.94
Network and Selective Router-costs for ICN circuits, TCS contract, transport services, selective routing, and automatic location services	$ 557,842.58	$ 609,022.99	$ 596,917.36	$ 622,396.73	$ 2,386,179.66
Carryover Fund Expenditures-future network and equipment upgrades and PSAP equipment upgrades					$ 4,054,381.94
PSAP Distribution	$ 3,265,837.16	$ 3,076,217.32	$ 3,152,926.96	$ 3,202,926.96	$ 12,697,540.18
Total Expenditures					**$ 19,846,063.72**

Attachment 6

Cost Savings with Next Generation 911 System

Wireless E911 Surcharge Expenditures		
Payment Types	October 2010	October 2014
Wireless Carrier Cost Recovery [1]	$ 661,934.06	$ 141,757.28
ALI, Routing and Transport[2]	$ 1,700,375.26	$ 557,842.58
PSAP[3]	$ 1,066,231.70	$ 3,265,837.16
	$ 3,428,541.02	**$ 3,965,437.02**
1) Costs are based on actual costs		
2) Costs are based on actual costs. These numbers indicate a savings of $1,142,532.68 from October 2010 compared to October 2014 by migrating to an IP enabled Next Generation System provided by ICN		
3) Pass through in 2010 was 25% of revenue, in 2014 it is 46%		

National Highway Traffic Safety Administration Technical Assistance Program Statewide EMS Re-Assessment

Attachment 29

Next Generation 911 GIS Standards

Iowa Homeland Security and Emergency Management Department

Next Generation 9-1-1 GIS Standards

Table of Contents

Record of Change

CHANGE NO.	DESCRIPTION	CHANGE DATE	SIGNATURE
001			

These Iowa Statewide NG9-1-1 GIS Standards are subject to information updates and changes. The use of this Record of Change helps manage Iowa NG9-1-1 GIS Standards modifications throughout the life of this document. All attempts have been made to ensure the accuracy of the information within this Iowa NG9-1-1 Standards as of the initial distribution date. Any subsequent adjustments should be logged, and coordinated by the E9-1-1 Director of the Iowa Homeland Security Emergency Management Department and approved by the NG9-1-1 Advisory Committee.

The committee members that provided oversight and contributed to the development of these Iowa NG9-1-1 GIS Standards include:

AGENCY	INDIVIDUAL	TITLE
Iowa HSEMD	Barbara Vos (Iowa HSEMD Project Manager)	E911 Program Manager
Iowa HSEMD GIS	Jon Paoli	GIS Coordinator
Hardin/Franklin County	Micah Cutler	GIS Coordinator
Johnson County GIS	Jay Geisen	GIS Specialist
Des Moines GIS	Aaron Greiner	GIS Analyst
West Des Moines, GIS	Lawrence Hartpence	GIS Analyst
Dubuque County GIS	Jeff Miller	GIS Coordinator
Humboldt County 9-1-1 GIS	Cherese Sexe	9-1-1 System Administrator
Scott County GIS	Ray Weiser	GIS Coordinator

1.0 Executive Summary

As an integral part of the NG9-1-1 call process, Geographic Information Systems (GIS) map data is leveraged to route 9-1-1 calls to the correct Public Safety Answering Point (PSAP), to display a caller's location in tactical PSAP mapping systems, and to provide valuable life-saving information to emergency response personnel. Before a county or city's GIS data can take on these critical roles in the State of Iowa's Next Generation (NG) 9-1-1 system, certain elements must first be considered. What existing GIS data can be used? Does existing GIS data meet minimum accuracy requirements for NG9-1-1? What standard schema should be followed?

The GIS data created following the standards outlined in this document will serve the purpose of validating civic address locations, defining PSAP and Emergency Services boundaries for the routing and transfer of 9-1-1 calls, and defining the authoritative data sources at the local, regional, and State level. The resulting GIS data can then be coalesced and provisioned into the State of Iowa's NG9-1-1 system.

This standards document was a collaborative effort between the Iowa NG9-1-1 Advisory Committee, the Iowa Homeland Security and Emergency Management Department (HSEMD), and GeoComm, Inc. and will provide a solid foundation for NG9-1-1 GIS dataset development in the State of Iowa. At its core, this document follows the DRAFT NENA Standard for NG9-1-1 GIS Data Model, and as such, may be amended in the future as the DRAFT standards are finalized and made public.

1.1 Purpose

These standards will define a common data model and set minimum accuracy benchmarks to be attained before local data is integrated into a statewide NG9-1-1 GIS dataset. Existing and emerging industry standards at the national level were considered in the development of NG9-1-1 standards for the State of Iowa. The result is an authoritative document that can be used by local jurisdictions as a guide in updating their GIS data to meet NG9-1-1 standards.

Essentially, there are two types of GIS data that are required in the Emergency Call Routing Function (ECRF) and Location Validation Function (LVF) functional elements of a NG9-1-1 system, and they are emergency service area boundaries, and address location data. The layers and schema are subject to change based on functionality criteria of the ECRF and LVF elements. Additionally, this standard does not conform to the requirements of any specific vendor systems for CAD, CPE, and dispatch mapping applications. Any refinement required from an operational standpoint will need to be considered and a subsequent version of the standards published to meet those requirements.

The schema contained in these standards was developed to accommodate all address elements in the Presence Information Data Format – Location Object (PIDF-LO) as outlined in NENA 08-003 Detailed

Functional and Interface Specification for the NENA i3 Solution and are subject to change based on Emergency Services Routing Proxy (ESRP) requirements for the State of Iowa's NG9-1-1 system.

2.0 Background Terminology

The following terms are a subset of the terms defined in NENA 08-003 Detailed Functional and Interface Specification for the NENA i3 Solution. They serve to lay the base terminology incorporated into the GIS attribute definitions in subsequent sections of these standards.

TERM	DEFINITION
9-1-1 Authority	The local agency responsible for overall operation of, and data for the 9-1-1 system.
Agency Identifier	A domain name for an agency used as a globally unique identifier.
Border Control Function (BCF)	A BCF sits between external networks and the ESInet and between the ESInet and agency networks. All traffic from external networks transits a BCF.
Domain (or Domain Name)	The domain name (hostname) of an agency or element in an ESInet. See Domain Name System (DNS).
Element Identifier	A logical name used to represent physical implementation of a functional element or set of functional elements as a single addressable unit. The form of an element identifier is a hostname.
Emergency Call Routing Function (ECRF)	A functional element in an ESInet which is a LoST protocol server where location information (either civic address or geo-coordinates) and a Service URN serve as input to a mapping function that returns a URI used to route an emergency call toward the appropriate PSAP for the caller's location or towards a responder agency.
Emergency Services IP Network (ESInet)	An ESInet is a managed IP network that is used for emergency services communications, and which can be shared by all public safety agencies. It provides the IP transport infrastructure upon which independent application platforms and core functional processes can be deployed, including, but not restricted to, those necessary for providing NG9-1-1 services. ESInets may be constructed from a mix of dedicated and shared facilities. ESInets may be interconnected at local, regional, state, federal, national and international levels to form an IP-based inter-network (network of networks).
Emergency Services Routing Proxy (ESRP)	An i3 functional element which is a SIP proxy server that selects the next hop routing within the ESInet based on location and policy. There is an ESRP on the edge of the ESInet. There is usually an ESRP at the entrance to an NG9-1-1 PSAP. There may be one or more intermediate ESRPs between them.

TERM	DEFINITION
Location	In the context of location information to support IP-based emergency services: The physical position of an end-point expressed in either civic or geodetic form. A spot on the planet where something is; a particular place or position. Oxford Dictionary, Oxford University Press, 2009.
Location Information Server (LIS)	A Location Information Server (LIS) is a functional entity that provides locations of endpoints. A LIS can provide Location-by-Reference, or Location-by-Value, and, if the latter, in geo or civic forms. A LIS can be queried by an endpoint for its own location, or by another entity for the location of an endpoint. In either case, the LIS receives a unique identifier that represents the endpoint, for example an IP address, circuit-ID or MAC address, and returns the location (value or reference) associated with that identifier. The LIS is also the entity that provides the dereferencing service, exchanging a location reference for a location value.
Location to Service Translation (LoST) Protocol	A protocol that takes location information and a Service URN and returns a URI. Used generally for location-based call routing. In NG9-1-1, used as the protocol for the ECRF and LVF.
Location Validation Function (LVF)	Function used to validate civic address location information for storage in a LIS prior to a 9-1-1 call being placed.
Location URI	A URI which, when dereferenced, yields a location value in the form of a PIDF-LO. Location-by-reference in NG9-1-1 is represented by a Location URI.
Mapping	The act of determining a value in one domain from a value in another domain. For example, mapping a location to the URI of a PSAP that serves that location using the LoST protocol.
Next Hop	The next element in a routing path. For example, the next router in an IP network, or the next SIP proxy server in a SIP signaling path.
Originating Emergency Services Routing Proxy (ESRP)	The first routing element inside the ESInet. It receives calls from the BCF at the edge of the ESInet.
Policy Routing Function (PRF)	That functional component of an Emergency Services Routing Proxy that determines the next hop in the SIP signaling path using the policy of the nominal next element determined by querying the ECRF with the location of the caller.
Presence Information Data Format – Location Object (PIDF-LO)	Provides a flexible and versatile means to represent location information in a SIP header using an XML schema.
Request URI	That part of a SIP message that indicates where the call is being routed towards. SIP Proxy servers commonly change the Request ID (“retargeting”) to route a call towards the intended recipient.
ReverseGeocode	The process of converting a geo form of location (X,Y) to a civic (street address) form.

TERM	DEFINITION
Scheme	The part of a URI that indicates the protocol. For example, the scheme in the URI sip:john@example.com is "sip".
Service Boundary	A polygon in a GIS system, SIF, ECRF or other ESInet element that indicates the area a particular agency or element serves.
Session Initiation Protocol (SIP)	An IETF defined protocol (RFC3261) that defines a method for establishing multimedia sessions over the Internet. Used as the call signaling protocol in VoIP, i2 and i3.
Service Uniform Resource Name (Service URN)	A URN with "service" as the first component supplied as an input in a LoST request to an ECRF to indicate which service boundaries to consider when determining a response. A service URN is also used to mark a call as an emergency call.
SOS URN	A service URN starting with "urn:service:sos" which is used to mark calls as emergency calls as they traverse an IP network.
Subscriber Database (SDB)	A database operated by a carrier or other service provider which supplies the "Additional Call" data object. The SDB dereferences the URI passed in a Call-Info header and returns the AdditionalCall XML object.
Terminating ESRP	The last ESRP for a call in an ESInet, which typically chooses a queue of call takers to answer the call.
URI	See definition for "Location URI"
URN	See definition for "Service URN"
eXtensible Markup Language (XML)	An internet specification for web documents that enables tags to be used that provide functionality beyond that in Hyper Text Markup Language (HTML). Its reference is its ability to allow information of indeterminate length to be transmitted to a PSAP call taker or dispatcher versus the current restriction that requires information to fit the parameters of pre-defined fields.

3.0 Layer and Attribute Definitions

3.1 GIS Layer Categories

The categories defining GIS layer requirements in a NG9-1-1 system in this document fit into two categories, Required and Highly Recommended. These categories are defined below.

Required

The core elements of a NG9-1-1 call routing system where GIS data resides are the LVF and ECRF, which serve the purpose of first validating location information (LVF), and then determining the proper routing of the call (ECRF). The layers below are the minimum layers required to serve those purposes.

LAYER NAME	RESPONSIBLE PARTY
Road Centerline	Local Jurisdiction
Site/Structure Address Points	Local Jurisdiction
PSAP Boundaries	Local Jurisdiction
Emergency Service Boundaries (Fire, Law, EMS)	Local Jurisdiction
Authoritative Boundaries	State Level

Highly Recommended

To further refine the required GIS data, and provide even more accurate location validation and call routing, the following layers can be provisioned to the ECRF and LVF.

LAYER NAME	RESPONSIBLE PARTY
Road Name Alias Table	Local Jurisdiction
State Boundary	State Level
County Boundaries	State Level
Municipal Boundaries	Local Jurisdiction
Cell Sector Locations	Local Jurisdiction

3.2 GIS Attribute Categories

GIS layer attributes will fall into one of three categories for attribution purposes.

- M – Mandatory: indicates the field must be present, and appropriately populated in local datasets.
- C – Conditional: indicates the field must be present in local datasets, and if the attribute exists, the field must be populated. If the attribute does not exist, the field will be left blank.
    - Example: PRD (Pre-Direction) is a Conditional field. In the address "1234 N Oak St", the pre-direction exists (N), therefore the field is populated.
- O – Optional: indicates the field can be present in local datasets, but its population is not required.

3.3 GIS Attribute Types

GIS layer attribute types are defined below

- A – Alphanumeric: any combination of upper and lower case letters A to Z and/or any number from 0 to 9

- N – Numeric: consisting of whole numbers only
- D – Date: Date and time using ISO 8601 compliant formats which are in the format of YYYY-MM-DDThh:mm:ss.sTZD

3.4 Supplemental information – Location Elements

NG9-1-1 systems are IP based networks and much more robust than existing landline, trunk-based E9-1-1 systems. The caller's voice along with location is transmitted through the network in what is called a Session Initiation Protocol (SIP) package. That SIP package contains the location information in the form of Presence Information Data Format – Location Object (PIDF-LO). Location elements are represented in the PIDF-LO parsed out into individual components framed by eXstensible Markup Language (XML) tags. This is the reason the schema for every layer to be provisioned into ECRF/LVF components includes the associated XML tags for those location elements.

Example:

<country>US</country>
<A1>IA</A1>
<A2>Polk</A2>
<A3>Johnston</A3>
<PRD>NW</PRD>
<RD>78TH</RD>
< STP>Avenue</STP>
<HNO>6100</HNO>

The NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard[1] was published on March 23, 2014. This standard defines the correlation of civic address location elements to their corresponding PIDF-LO XML tags, and was incorporated into the schema in this document for the State of Iowa. This ensures that the location data as validated in the GIS data correctly maps to the location elements carried along the data stream during a 9-1-1 call.

4.0 Spatial Requirements

4.1 Data Format

It is understood that Esri format is the most prevalent platform used by agencies for the maintenance of GIS data. However, in the interest of remaining vendor-neutral, there is no specific data format required for incorporation into the Iowa statewide GIS layers.

[1] https://www.nena.org/?NG911CLDXF

4.2 Coordinate Reference System and Datum

The Detailed Functional and Interface Specifications for the NENA i3 Solution (NENA 08-003)[2] describe NENA's specifications for an NG9-1-1 i3 solution. This includes requirements around GIS data coordinate reference system and datum and is identified as World Geodetic System of 1984 (WGS84). This is the required coordinate reference system for data that resides within the ECRF. Data can be maintained in an alternate coordinate reference system, however a transformation will need to be completed to WGS84 before the data is provisioned to the ECRF.

EPSG:4326 WGS 84 / Latlong
Projection: Geographic, Plate Carrée, Equidistant Cylindrical, Equirectangular
Latitude of the origin: 0°
Longitude of the origin 0°
Scaling factor: 1
False eastings: 0°
False northings: 0°
Ellipsoid: WGS84
Horizontal Datum WGS84 Vertical Datum: WGS84 Geoid, which is equivalent to Local Mean Sea Level (MSL)
Units: decimal degrees
Global extent: -180, -90, 180, 90

4.3 Best Practices

The focus of these standards is to support location validation and geospatial call routing in a NG9-1-1 system. However, the State also recognizes the importance of best practice recommendations related to business rules for feature geometry. A subsequent version of this document will be released including these business rules, to be developed in collaboration between the Iowa NG9-1-1 Advisory Committee, Iowa HSEMD, and Iowa DOT.

[2] NENA 08-003: http://www.nena.org/?page=i3_Stage3

5.0 Required Layer Category

5.1 Road Centerline

The baseline layer needed for validation of civic address location information is an address ranged road centerline. This layer's attribute structure is what will absorb the content and purpose currently served by the MSAG in E9-1-1 systems. ESN and MSAG specific fields will be maintained as long as a legacy system interface is needed, and are expected to be deleted from the data model in the future as a fully realized NG9-1-1 i3 system is put in place.

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.
					Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid.
					Example: 2020-05-25T10:23:16-6.00
RCL_UID	RoadUnqID	M	A	100	Combination of the static unique numerical ID and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set of data.
					Example: 1215@stormlake.ia.us
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: US, CA, MX
STATE_L	StateProvinceLeft	M	A	2	Two-letter State name as defined by ISO 3166-1. English country alpha-2

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					code elements in capital ASCII letters.
					Example: IA (Iowa), MN (Minnesota)
STATE_R	StateProvinceRight	M	A	2	Two-letter State abbreviation defined by USPS Publication 28, on the Right side of the road segment.
					Example: IA (Iowa), MN (Minnesota)
COUNTY_L	CountyLeft	M	A	40	County Name designated on the Left side of the road segment, completely spelled out, as defined in INCITS 38:2009
					Example: Henry County
COUNTY_R	CountyRight	M	A	40	County Name designated on the Right side of the road segment, completely spelled out, as defined in INCITS 38:2009
					Example: Henry County
INC_MUNI_L	IMunicipalityLeft	M	A	100	Incorporated municipality name where the address is located, on the Left side of the road segment. If a municipality name does not exist, populate with “Unincorporated”.
					Example: Des Moines, Sioux City
INC_MUNI_R	IMunicipalityRight	M	A	100	Incorporated municipality name where the address is located, on the Right side of the road segment. If a municipality name does not exist, populate with “Unincorporated”.
					Example: Des Moines, Sioux City
UN_COMM_L	MuniDivisionLeft	C	A	100	Unincorporated Community name where the address is located, on the Left side of the road segment, either within an incorporated municipality or within an unincorporated portion of a county, or both.
					Example: Amana Colonies
UN_COMM_R	MuniDivisionRight	C	A	100	Unincorporated Community name

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					where the address is located, on the Right side of the road segment, either within an incorporated municipality or within an unincorporated portion of a county, or both.
					Example: Amana Colonies
NGHBD_L	NeighborhoodLeft	O	A	100	Unincorporated Neighborhood name where the address is located, on the Left side of the road segment, either within an incorporated municipality or within an unincorporated portion of a county, or both.
					Example: Woodland Heights
NGHBD_R	NeighborhoodRight	O	A	100	Unincorporated Neighborhood name where the address is located, on the Right side of the road segment, either within an incorporated municipality or within an unincorporated portion of a county, or both.
					Example: Woodland Heights
ADD_PFX_L	AddRangePrefixLeft	C	A	15	The first portion of a hyphenated address number on the left side of the road segment.
					Example: "99-" in 99-205 Red Oak Rd
ADD_PFX_R	AddRangePrefixRight	C	A	15	The first portion of a hyphenated address number on the right side of the road segment.
					Example: "3NW-" in 3NW-1612 County Line Rd
L_FROM_ADD	LeftFromAddress	M	N	6	The beginning range on the Left side of the road segment at the FROM node. NOTE: This address can be higher than the "Left TO Address"

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
L_TO_ADD	LeftToAddress	M	N	6	The end range on the Left side of the road segment at the TO node. NOTE: This address can be lower than the "Left FROM Address"
R_FROM_ADD	RightFromAddress	M	N	6	The address on the Right side of the road segment at the FROM node. NOTE: This address can be higher than the "Right TO Address"
R_TO_ADD	RightToAddress	M	N	6	The address on the Right side of the road segment at the TO node. NOTE: This address can be lower than the "Right FROM Address"
PARITY_L	ParityLeft	M	A	1	Parity designation for Address Range on the Left side of the road segment.
					Example: E, O, B, Z for Even, Odd, Both, or Zero (if the range is 0 to 0).
PARITY_R	ParityRight	M	A	1	Parity designation for Address Range on the Right side of the road segment.
					Example: E, O, B, Z for Even, Odd, Both, or Zero (if the range is 0 to 0).
POSTCOMM_L	PostalCommunityLeft	C	A	40	The city name for the ZIP code where the address is located as defined in the USPS City State file, on the Left side of the road segment.
					Example: Des Moines for Zip codes: 50314 and 50318
POSTCOMM_R	PostalCommunityRight	C	A	40	The city name for the ZIP code where the address is located as defined in the USPS City State file, on the Right side of the road segment.
					Example: Des Moines for Zip codes:

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					50314 and 50318
ZIP_L	PostalCodeLeft	C	A	7	The 5-digit code where the address is located that identifies the individual USPS Post Office or metropolitan area delivery station associated with an address, on the Left side of the road segment. ZIP plus 4 should NOT be included.
					Example: 50130
ZIP_R	PostalCodeRight	C	A	7	The 5-digit code where the address is located that identifies the individual USPS Post Office or metropolitan area delivery station associated with an address, on the Right side of the road segment. ZIP plus 4 should NOT be included.
					Example: 50130
ESN_L	ESNLeft	M	A	5	The Emergency Service Number where the address is located as identified by the MSAG, on the Left side of the road segment.
					Example: 4216
ESN_R	ESNRight	M	A	5	The Emergency Service Number where the address is located as identified by the MSAG, on the Right side of the road segment.
					Example: 4216
MSAGCOMM_L	MSAGCommunityLeft	M	A	40	The valid service community name where the address is located, on the Left side of the road segment as identified by the MSAG.
					Example: Grafton
MSAGCOMM_R	MSAGCommunityRight	M	A	40	The valid service community name where the address is located, on the Right side of the road segment as identified by the MSAG.
					Example: Grafton

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
PRM	PRM	O	A	15	Pre-modifier. A word or phrase that precedes the Street Name element but is separated from it by a Street Name Pre Type or a Street Name Pre Directional or both. Example: Access, Alternate, Business, Bypass, Connector, Extended, Extension, Loop, Old, Overpass, Private, Public, Ramp, Scenic, Spur, Underpass.
PRD	PRD	C	A	2	A word preceding the Street Name that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located. Example: N, S, E, W, NE, NW, SE, SW
STP	STP	C	A	20	A word or phrase that precedes the Street Name element and identifies a type of thoroughfare in a complete street name. Must always be spelled out. Example: "County Road" in County Road 20, "Interstate" in Interstate 34
STPS	STPS	C	A	15	A prepositional word or phrase between the Street Name Pre Type and the Street Name Example: "of the" in Avenue of the Saints
STN	RD	M	A	60	Street Name. The element of the complete street name that identifies the particular street (as opposed to any street types, directionals, and modifiers) Example: "Oak" in South Oak Street
STS	STS	C	A	4	A word or phrase that follows the

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					Street Name element and identifies a type of thoroughfare in a complete street name. See USPS Publication 28 Appendix C1 for valid entries
					Example: "Street" in South Oak Street
POD	POD	C	A	2	A word following the Street Name that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.
					Example: N, S, E, W, NE, NW, SE, SW
POM	POM	C	A	12	A word or phrase that follows and modifies the Street Name, but is separated from it by a Street Name Post Type or a Street Name Post Directional or both.
					Example: Access, Alternate, Business, Bypass, Connector, Extended, Extension, Loop, Overpass, Private, Public, Ramp, Scenic, Spur, Underpass
SPEED	SpeedLimit	O	N	3	Posted Speed in mph
ONEWAY	OneWay	O	A	2	One-way direction of travel.
					B or Blank – travel in both directions allowed
					FT – One-way traveling from FROM node to TO node
					TF – One way traveling from TO node to FROM Node
ROAD_CLASS	RoadClassType	O	A	15	Primary
					Secondary
					Local (City, Neighborhood, or Rural Road)
					Ramp
					Service (usually along a limited

ROAD CENTERLINES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					access highway)
					Vehicular Trail (4WD, snowmobile)
					Walkway (Pedestrian Trail, Boardwalk)
					Alley
					Private (service vehicles, logging, oil fields, ranches, etc.)
					Parking Lot
					Trail (Ski, Bike, Walking / Hiking Trail)
					Other

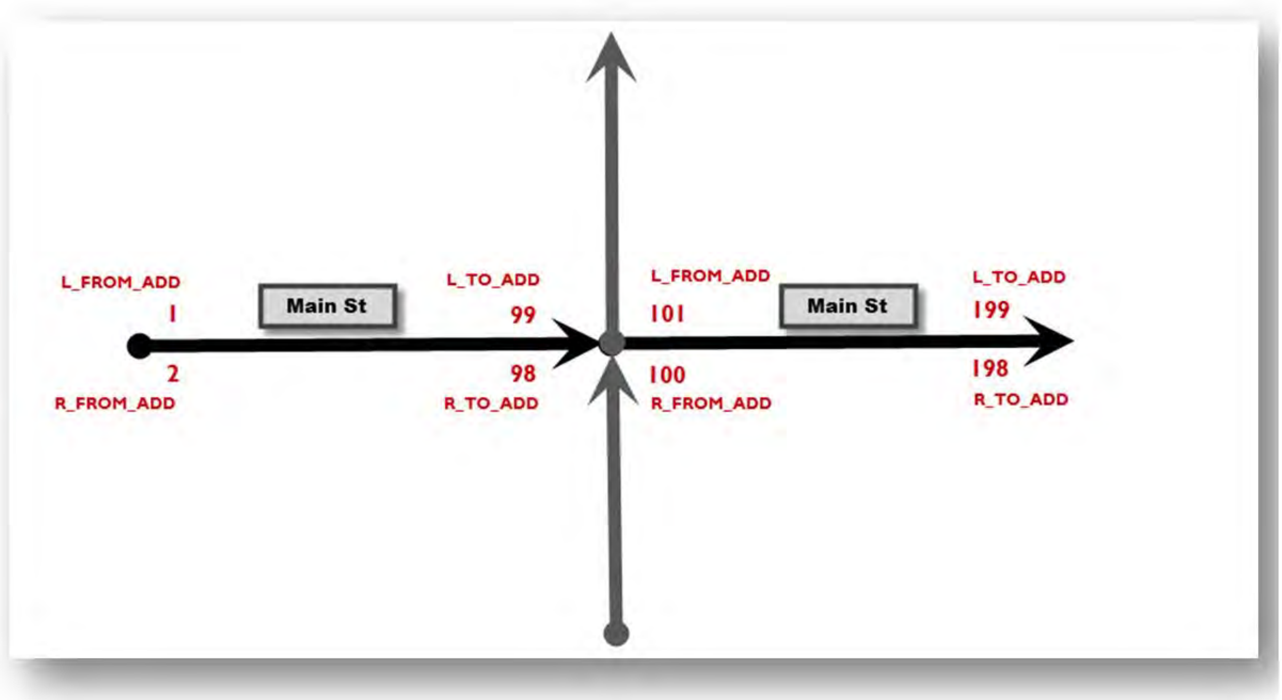


Figure 1: This graphic depicts the explanation of "From" and "To" address ranges described in the attribute descriptions above for L_FROM_ADD, L_TO_ADD, R_FROM_ADD, and R_TO_ADD.

5.2 Site/Structure Address Points

Site/Structure Address Points provide a more accurate representation of the true location of a civic address. At times, depending on the point placement, address points located on a structure can fall in a different ESN or Community than interpolated location off the address ranged road centerline for that address. For this reason, Address Points are a highly recommended layer to enhance the location validation accuracy of a NG9-1-1 system.

Placement Properties

NENA is currently working on an informational document concerting spatial point placement methodologies. In terms of ECRF call routing functionality, the only consideration is whether the point falls within the proper PSAP boundary for iterative routing.

SITE/STRUCTURE ADDRESS POINTS					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.
					Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid.
					Example: 2020-05-25T10:23:16-6.00
SITE_UID	SiteUnqID	M	A	100	Combination of the static unique numerical point ID and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set of data.
					Example: 23548@johnston.ia.us
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: US, CA, MX
STATE	A1	M	A	2	Two-letter State name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: IA (Iowa), MN (Minnesota)
COUNTY	A2	M	A	40	County Name in which the point is located, completely spelled out, as

SITE/STRUCTURE ADDRESS POINTS					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					defined in INCITS 38:2009 Example: Henry County
INC_MUNI	A3	M	A	100	Incorporated municipality name where the address is located. If a municipality name does not exist, populate with “Unincorporated”. Example: Des Moines, Sioux City
UN_COMM	A4	C	A	100	Unincorporated Community name where the address is located, either within an incorporated municipality or within an unincorporated portion of a county, or both. Example: Amana Colonies??
NGHBD_COMM	A5	C	A	100	Unincorporated Neighborhood name where the address is located, either within an incorporated municipality or within an unincorporated portion of a county, or both. Example: ??
HNP	HNP	O	A	15	An extension of the address number that precedes it and further identifies a location along a thoroughfare or within a defined area. Example: "B" in B350 Greenberg Pl
HNO	HNO	C	N	6	The numeric identifier of a location along a thoroughfare or within a defined community. Example: "101" in 101 Main St
HNS	HNS	C	A	15	An extension of the address number that follows it and further identifies a location along a thoroughfare or within a defined area. Example: “1/2” in 305 ½ Cherry St, “B” in 250B Bluebird Ave
PRM	PRM	O	A	15	Pre-modifier. A word or phrase that precedes the Street Name element but is separated from it by a Street Name

SITE/STRUCTURE ADDRESS POINTS					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
					Pre Type or a Street Name Pre Directional or both.
					Example: Access, Alternate, Business, Bypass, Connector, Extended, Extension, Loop, Old, Overpass, Private, Public, Ramp, Scenic, Spur, Underpass.
PRD	PRD	C	A	2	A word preceding the Street Name that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.
					Example: N, S, E, W, NE, NW, SE, SW
STP	STP	C	A	20	A word or phrase that precedes the Street Name element and identifies a type of thoroughfare in a complete street name. Must always be spelled out.
					Example: "County Road" in County Road 20, "Interstate" in Interstate 34
STPS	STPS	C	A	15	A prepositional word or phrase between the Street Name Pre Type and the Street Name
					Example: "of the" in Avenue of the Saints
STN	RD	M	A	60	The element of the complete street name that identifies the particular street (as opposed to any street types, directionals, and modifiers)
					Example: "Oak" in South Oak Street
STS	STS	C	A	4	A word or phrase that follows the Street Name element and identifies a type of thoroughfare in a complete street name. See USPS Publication 28 Appendix C1 for valid entries
					Example: "Street" in South Oak Street
POD	POD	C	A	2	A word following the Street Name that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.

SITE/STRUCTURE ADDRESS POINTS					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					Example: N, S, E, W, NE, NW, SE, SW
POM	POM	C	A	12	A word or phrase that follows and modifies the Street Name, but is separated from it by a Street Name Post Type or a Street Name Post Directional or both.
					Example: Access, Alternate, Business, Bypass, Connector, Extended, Extension, Loop, Overpass, Private, Public, Ramp, Scenic, Spur, Underpass
ESN	ESN	M	A	5	The Emergency Service Number where the address is located as identified by the MSAG.
					Example: 4225
MSAG_COMM	MSAGCommunity	M	A	40	The valid service community name where the address is located, as identified by the MSAG.
					Example: Manly
POST_COMM	PCN	C	A	40	The city name for the ZIP code where the address is located as defined in the USPS City State file.
					Example: Clear Lake
ZIP	PC	C	A	7	The 5-digit code where the address is located that identifies the individual USPS Post Office or metropolitan area delivery station associated with an address.
					Example: 50427
ZIP_PLUS_4	PC4	O	A	4	The ZIP plus 4 code (without the dash)
					Example: 1234
BLD	BLD	O	A	75	One among a group of buildings that have the same address number and complete street name.
					Example: "Building A" in 456 Oak Street, Building A, Apt 206 "Terminal 3" in John F. Kennedy

SITE/STRUCTURE ADDRESS POINTS					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
					International Airport, Terminal 2
FLR	FLR	O	A	75	A floor, story, or level within a building. "Floor 5" in 800 Jefferson Street, Floor 5 "5th Floor" in 800 Jefferson Street, 5th Floor "Mezzanine" in 800 Jefferson Street, Mezzanine
UNIT	UNIT	O	A	75	A group or suite of rooms within a building that are under common ownership or tenancy, typically having a common primary entrance. Example: "Apartment 12" in 541 Arbor Avenue, Apartment 12 "Suite 3103" in 4300 Flamingo Street, Suite 3102
ROOM	ROOM	O	A	75	A single room within a building. Example: "Room 450F" in 1440 Market St, Room 450F "Mississippi Room" in 565 Jefferson Street, Mississippi Room "Lobby" in 1200 Main St, Lobby
SEAT	SEAT	O	A	75	A place where a person might sit within a building. Example: "Cubicle 23" in 2500 Seventh Street, Room 105, Cubicle 23 "Registration Desk" in Grand Hotel, 1101 Madison Street, Registration Desk
LOC	LOC	O	A	255	Additional location information, which is not a building, floor, unit, room or seat. Example: SW corner of warehouse
LMK	LMK	O	A	150	The name by which a prominent feature is publicly known Example: Central High School, Crossroads Mall, Empire State Building

SITE/STRUCTURE ADDRESS POINTS					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
MILEPOST	Milepost	C	A	150	A distance travelled along a route such as a road or highway, typically indicated by a milepost sign. There is typically a post or other marker indicating the distance in miles/kilometers from or to a given point
					Example: Mile Marker 185.7
PLC	PLC	C	A	50	Type of feature identified by the address
					Example: school, arena, bank, hospital
LONG	Long	O	F	12	Value represented in decimal degrees east or west of the prime meridian.
LAT	Lat	O	F	11	Value represented in decimal degrees north or south of the equator
ELEV	Elev	O	N	6	Height above Mean Sea Level in meters

5.3 PSAP Boundaries

The PSAP boundary is the most critical layer for the initial routing of 9-1-1 calls to the correct PSAP in a NG9-1-1 system.

PSAP BOUNDARIES					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.
					Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid.
					Example: 2020-05-25T10:23:16-6.00
EMSERV_UID	ESUnqID	M	A	100	Combination of the Emergency Service type, the static unique numerical ID, and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set

PSAP BOUNDARIES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					of data.
					Examples: PSAP_21@SECC911.IA.us.gov EMS_75@SECC911.IA.us.gov FIRE_88@SECC911.IA.us.gov LAW_101@SECC911.IA.us.gov
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: IA (Iowa), MN (Minnesota)
AGENCY_ID	AgencyId	M	A	100	A domain name which is used to uniquely identify any agency. Example: psap.clearlake.IA.us
ROUTE_URI	RouteURI	M	URI	255	Uniform Resource Identifier (URI) used for call routing following the syntax format described in IETF RFC 3986. Must be unique in an aggregated set of data. Example: sip:sos.law@city.eoc.ia.us
SERV_URN	ServiceURN	M	URN	50	The Uniform Resource Name (URN) for the Emergency Service requested Examples: urn:service:sos for 9-1-1 PSAP urn:service:sos.ambulance for an ambulance service
SERV_NUM	ServiceNumber	O	A	15	The numbers that would be dialed on a 12 digit keypad to reach the emergency service appropriate for the location. Examples: 911 to reach a PSAP (in PSAP boundary layer) (515) 283-4824 to reach Des Moines Police Department (in Law layer)
VCARD_URI	AvCardURI	M	URI	255	URI for the vCARD of contact

PSAP BOUNDARIES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					information.
					Example: http://tools.ietf.org/html/rfc6349
DISP_NAME	DispName	M	A	60	Display Name of the Service
					Example: Waterloo PD

5.4 Emergency Services Boundaries

For the transfer of calls based on the type of service requested, individual Emergency Service boundary layers are needed for Fire, Law, and EMS. The schema below is meant to serve as a template for the creation of all three of these layers, Fire, Law, and EMS.

EMERGENCY SERVICES BOUNDARIES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.
					Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid.
					Example: 2020-05-25T10:23:16-6.00
EMSERV_UID	ESUnqID	M	A	100	Combination of the Emergency Service type, the static unique numerical ID, and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set of data.
					Examples: PSAP_21@SECC911.IA.us.gov EMS_75@SECC911.IA.us.gov FIRE_88@SECC911.IA.us.gov LAW_101@SECC911.IA.us.gov
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.

EMERGENCY SERVICES BOUNDARIES					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
					Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: IA (Iowa), MN (Minnesota)
AGENCY_ID	AgencyId	M	A	100	A domain name which is used to uniquely identify any agency. Example: psap.clearlake.IA.us
ROUTE_URI	RouteURI	M	URI	255	Uniform Resource Identifier (URI) used for call routing following the syntax format described in IETF RFC 3986. Must be unique in an aggregated set of data. Example: sip:sos.law@city.eoc.ia.us
SERV_URN	ServiceURN	M	URN	50	The Uniform Resource Name (URN) for the Emergency Service requested Examples: urn:service:sos for 9-1-1 PSAP urn:service:sos.ambulance for an ambulance service
SERV_NUM	ServiceNumber	O	A	15	The numbers that would be dialed on a 12 digit keypad to reach the emergency service appropriate for the location. Examples: 911 to reach a PSAP (in PSAP boundary layer) (515) 283-4824 to reach Des Moines Police Department (in Law layer)
VCARD_URI	AvCardURI	M	URI	255	URI for the vCARD of contact information. Example: http://tools.ietf.org/html/rfc6349
DISP_NAME	DispName	M	A	60	Display Name of the Service Example: Waterloo PD

5.5 Authoritative Boundary

GIS data is expected to be provided from a variety of sources for coalescing into the overall statewide layers. The authoritative boundary is intended to represent the boundary extent (city, county, region) for which the GIS data is provided. For example, if a city is providing their data directly, the authoritative boundary is a single polygon for that city boundary. If that city provides their data to the county, and thus the county is the authoritative source of data into the statewide layers, then the county boundary becomes the single polygon for the county as the authoritative source. The same holds true if multiple counties supply data to a regional entity. Thus each authoritative source provides a single polygon boundary, and those boundaries become coalesced at the State level where no overlaps or gaps are allowed. This layer will be used in the reporting of discrepancies back to the source for remediation.

AUTHORITATIVE BOUNDARY					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.01
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.
					Example: 2013-01-15T01:00:00-6.01
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid.
					Example: 2020-05-25T10:23:16-6.01
AU_BND_UID	ABUnqID	M	A	100	Combination of the static unique numerical ID, and the Authoritative Source ID to create a unique identifier within an aggregated set of data.
					Example: 212@Region12.eoc.ia
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: IA (Iowa), MN (Minnesota)
AGENCY_ID	AgencyId	M	A	100	A domain name which is used to uniquely

AUTHORITATIVE BOUNDARY					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					identify any agency.
					Example: psap.clearlake.IA.us
DISP_NAME	DispName	M	A	60	Display Name of the Service
					Example: Waterloo PD

6.0 Highly Recommended Layer Category

6.1 Road Name Alias Table

Road names, especially highways, have a tendency to change names as they traverse through cities and towns. For this reason, a standardized method for the creation and maintenance of road name aliases is outlined below.

ROAD NAME ALIAS TABLE					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.
					Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid.
					Example: 2020-05-25T10:23:16-6.00
ALIAS_UID	AliasUnqID	M	A	100	Combination of the static unique numerical ID and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set of data.
					Example: 23548@johnston.ia.us
RCL_UID	RoadUnqID	M	A	100	The RCL_UID from the Road Centerlines layer that corresponds to the segment the alias name is assigned to. Within the Road Name Alias Table the RCL_UID may be

ROAD NAME ALIAS TABLE					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					repeated for each Road Name Alias assigned to that Road Segment. The RCL_UID must be universally unique for each road segment, but may be repeated in this table for each Road Name Alias that is assigned to that road segment.
					Example: 1215@stormlake.ia.us
ALIAS_PRM	AliasPRM	O	A	15	A word or phrase that precedes the Street Name element but is separated from it by a Street Name Pre Type or a Street Name Pre Directional or both.
					Example: Access, Alternate, Business, Bypass, Connector, Extended, Extension, Loop, Old, Overpass, Private, Public, Ramp, Scenic, Spur, Underpass.
ALIAS_PRD	AliasPRD	C	A	2	A word preceding the Street Name that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.
					Example: N, S, E, W, NE, NW, SE, SW
ALIAS_STP	AliasSTP	C	A	20	A word or phrase that precedes the Street Name element and identifies a type of thoroughfare in a complete street name. Must always be spelled out.
					Example: "County Road" in County Road 20, "Interstate" in Interstate 34
ALIAS_STPS	AliasSTPS	C	A	15	A prepositional word or phrase between the Street Name Pre Type and the Street Name
					Example: "of the" in Avenue of the Saints
ALIAS_RD	AliasRD	M	A	60	The element of the complete street name that identifies the particular street (as opposed to any street types, directionals, and modifiers)
					Example: "Oak" in South Oak Street
ALIAS_STS	AliasSTS	C	A	4	A word or phrase that follows the Street Name element and identifies a type of

ROAD NAME ALIAS TABLE					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					thoroughfare in a complete street name. See USPS Publication 28 Appendix C1 for valid entries
					Example: "Street" in South Oak Street
ALIAS_POD	AliasPOD	C	A	2	A word following the Street Name that indicates the direction taken by the street from an arbitrary starting point or line, or the sector where it is located.
					Example: N, S, E, W, NE, NW, SE, SW
ALIAS_POM	AliasPOM	C	A	12	A word or phrase that follows and modifies the Street Name, but is separated from it by a Street Name Post Type or a Street Name Post Directional or both.
					Example: Access, Alternate, Business, Bypass, Connector, Extended, Extension, Loop, Overpass, Private, Public, Ramp, Scenic, Spur, Underpass

6.2 State Boundary

The final recommendations regarding inclusion of this layer in ECRF/LVF provisioning is still being debated at the workgroup level.

STATE BOUNDARY					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.

STATE BOUNDARY					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
					Example: IA (Iowa), MN (Minnesota)

6.3 County Boundaries

The final recommendations regarding inclusion of this layer in ECRF/LVF provisioning is still being debated at the workgroup level.

COUNTY BOUNDARIES					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
COUNTY_UID	CountyUnqID	M	A	100	Combination of the static unique numerical ID and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set of data.
					Example: 23548@johnston.ia.us
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters.
					Example: IA (Iowa), MN (Minnesota)
COUNTY	A2	M	A	40	County Name in which the point is located, completely spelled out, as defined in INCITS 38:2009
					Example: Henry County

6.4 Municipal Boundaries

The final recommendations regarding inclusion of this layer in ECRF/LVF provisioning is still being debated at the workgroup level.

MUNICIPAL BOUNDARIES					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record. Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format. Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format. Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid. Example: 2020-05-25T10:23:16-6.00
MUNI_UID	MunUnqID	M	A	100	Combination of the static unique numerical ID and the source 9-1-1 Authority ID to create a unique identifier within an aggregated set of data. Example: 23548@johnston.ia.us
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: IA (Iowa), MN (Minnesota)
COUNTY	A2	M	A	40	County Name in which the point is located, completely spelled out, as defined in INCITS 38:2009 Example: Henry County
INC_MUNI	A3	M	A	100	Incorporated municipality name. If a municipality name does not exist, populate with "Unincorporated". Example: Des Moines, Sioux City

6.5 Cell Sector Locations

NG9-1-1 systems can route wireless calls based on geodetic (coordinate based) locations of the calling device. Geodetic locations for mobile devices supported in NG9-1-1 are point, polygon, circle, ellipse, and arc-band. In some cases a latitude / longitude will be calculated fast enough to use for location based 9-1-1 call routing. In other cases a carrier will only be able to calculate an approximate location, such as a circle, ellipse, polygon, or arc-band, and the NG9-1-1 system will use the approximate location for location based 9-1-1 call routing. In these scenarios, no cell sector locations layer is necessary, since point or area geometries for mobile phone locations is computed in real time by wireless carrier position determination equipment, and made available in time for 9-1-1 call routing, and for display in the 9-1-1 PSAP.

However, in transitional NG9-1-1 systems (during the transition from E9-1-1 to NG9-1-1), carriers are generally unable to provide latitude/longitude coordinates for wireless 9-1-1 calls in time for routing, and are wholly unable to provide approximate geodetic locations (circle, ellipse, polygon, or arc-band) because required technology and interfaces are not available yet. In a transitional NG9-1-1 system, one accepted approach for routing wireless 9-1-1 calls is to utilize a look-up table to equate a 9-1-1 call's p/ANI to a cell sector polygon, insert the polygon into the call's PIDF-LO, and then query an ECRF using this location in order to determine the PSAP to route the call to. Cell sector polygons are also desirable to display in the 9-1-1 PSAP, when they are the best available approximate location for a 9-1-1 caller. For these reasons, and since all NG9-1-1 systems being implemented across the United States today are transitional in nature, the cell sector locations layer is a highly recommended GIS layer an a NG9-1-1 system.

Key considerations for building and maintaining a cell sector polygon layer include:

- ☐ Can the selected ESRP/LNG vendor provide p/ANI - to cell sector polygon - to PIDF-LO translation
- ☐ Can the selected PSAP mapping software display cell sector polygons

CELL SECTOR LOCATIONS					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
SOURCE	DataSource	M	A	75	The name of the source 9-1-1 Authority that last updated the record.
					Example: SECC911.IA.us.gov
UPDATED	LastUpdate	M	D	26	Date of last update using ISO 8601 format.
					Example: 2010-10-12T16:34:44-6.00
EFF_DATE	EffectiveDate	M	D	26	Date the new record information goes into effect using ISO 8601 format.

CELL SECTOR LOCATIONS					
FIELD	**XML**	**M/C/O**	**TYPE**	**WIDTH**	**DESCRIPTION**
					Example: 2013-01-15T01:00:00-6.00
EXP_DATE	ExpirationDate	O	D	26	Date when the information in the record is no longer considered valid. Example: 2020-05-25T10:23:16-6.00
COUNTRY	Country	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: US, CA, MX
STATE	A1	M	A	2	Two-letter Country name as defined by ISO 3166-1. English country alpha-2 code elements in capital ASCII letters. Example: IA (Iowa), MN (Minnesota)
COUNTY	A2	M	A	40	County Name in which the point is located, completely spelled out, as defined in INCITS 38:2009 Example: Henry County
Site ID	CEL	C	A	10	Some carriers have cell site identifications unique for that cell site within the entire carrier network. Leave blank if not applicable
Sector ID	SEC	M	A	4	Cell sector face or Omni as provided by carrier. Example: 1, 2, 3, Omni
Switch ID	MSC	C	A	10	The Mobile Switch Center ID to which cell site is homed to
Market ID	CMID	C	A	10	The Market ID associated with the Mobile Switch Center the cell site is homed too
Cell Site ID	CID	C	A	10	Name provided by the wireless service provider, usually unique to the cell site.
ESRD or first ESRK	ESR	C	N	10	The ESRD of the specific cell sector, if applicable, or the first number in the ESRK range for the PSAP
Last ESRK	LastESRK	C	N	10	Last number in the ESRK range for the PSAP. Not used for ESRD.
Sector Orientation	SecOrn	M	A	4	Antenna orientation associated with this location. Example: N, SE, SW

CELL SECTOR LOCATIONS					
FIELD	XML	M/C/O	TYPE	WIDTH	DESCRIPTION
Technology					Type of radio protocol being utilized.
					Example: LTE, CDMA, GSM

7.0 Synchronization and Accuracy Standards

7.1 Synchronization Standards

In NG9-1-1 systems, the Road Centerline layer in GIS is what will absorb the content and purpose currently served by the MSAG in E9-1-1 systems for civic address location validation. The process of translating location information and a service URN request into a routing URI takes place via a Location to Service Translation (LoST) Protocol. According to the NENA informational document (71-501), a minimum 98% synchronization rate between MSAG, ALI, and GIS data is recommended before GIS data is considered viable for use in a LoST protocol.

7.2 Accuracy Standards

Improving the synchronization as recommended in 8.1 will also serve the purpose of improving the overall accuracy of the GIS layers. Because the purpose of this document is to provide recommendations for GIS data for use in ECRF and LVF functional elements, the accuracy standards will focus only on those required layers that will be provisioned into the ECRF and LVF.

- Road Centerlines
    - Must contain all information currently maintained in the MSAG in line with all mandatory attributes defined in the schema above
    - Must be broken at all PSAP and Emergency Services boundaries to accommodate proper left/right attribution
- PSAP and Emergency Service Boundaries
    - Must represent geographic extent and proper boundaries for all PSAP and Emergency Services
    - Must not contain any overlaps or gaps among polygons
    - Must be attributed as outlined in schema above
- Authoritative Boundary
    - Must represent the geographic extent of the source agency providing GIS data for inclusion in statewide layers

- Must be attributed as outlined in schema above

8.0 Conclusion

There are many considerations and variables in developing a statewide GIS dataset for NG9-1-1. Without the proper groundwork, it can be a formidable task. These standards are meant to lay that groundwork, and provide guidance for local entities as they approach the task of bringing source GIS data up to the necessary standards for inclusion in statewide layers to be provisioned into the ECRF and LVF functional elements of Iowa's NG9-1-1 system.

These standards closely follow the NENA DRAFT NG9-1-1 GIS Data Model which was not published at the time of completion for the Iowa standards. This must be taken into consideration, and modification may be necessary pending the final version of the NENA data model. At this stage, it is not expected that the core elements guiding GIS data for location validation and call routing will undergo radical changes; therefore these standards will provide a solid foundation for NG9-1-1 GIS dataset development in the State of Iowa.

9.0 Reference Material and Recommended Reading

- NENA Detailed Functional and Interface Specification for the NENA i3 Solution – Stage 3 (i3), 08-003, Version 1, June 14, 2011
- NENA Information Document for Synchronizing Databases with MSAG & ALI, 75-001, Version 1.1, September 2009
- "NENA Standard for NG9-1-1 GIS Data Model", NENA-STA-XXX (DRAFT), National Emergency Number Association (NENA) Core Services Committee, Data Structures Subcommittee, NG9-1-1 GIS Data Model Working Group
- "NENA Standards for the Provisioning and Maintenance of GIS data to ECRF/LVF", (DRAFT – public review stage), National Emergency Number Association (NENA) Joint Data Technical Committee/ Operations Next Generation Integration Committee, Next Generation Data Development Working Group
- NENA Next Generation 9-1-1 (NG9-1-1) United States Civic Location Data Exchange Format (CLDXF) Standard, NENA-STA-004, March 23, 2014
- NENA Information Document for Synchronizing Geographic Information System databases with MSAG & ALI, NENA 71-501, Version 1.1, September 8, 2009
- Kansas NG9-1-1 GIS Data Model, version 1.0, GIS Subcommittee on behalf of the Kansas 911 Coordinating Council, May 7, 2014 http://www.kansas911.org/DocumentCenter/View/334
- NENA Master Glossary Of 9-1-1 Terminology, NENA ADM-000.17, National Emergency Number Association (NENA) Development Steering Committee (DSC), September 9, 2013
- Further references on NG9-1-1 http://www.nena.org/?NG911_Project

Attachment 30

Iowa Administrative Code 501—13

501—13.2(80B) Telecommunicator training.
13.2(1) *Basic training.* All persons employed primarily as telecommunicators after July 1, 1998, shall successfully complete an approved basic training course within one year of employment. For purposes of this chapter, a telecommunicator is defined as a person who receives requests for, or dispatches requests to, emergency response agencies which include, but are not limited to, law enforcement, fire, rescue, and emergency medical services agencies.

13.2(2) *In-service training requirements for former telecommunicators who return to a telecommunicator position.* Any individual who leaves and then returns to an Iowa telecommunicator position must receive, within one year of the individual's rehiring date, in-service training as follows:

Period Outside Iowa Telecommunications	Training Required
6 months to 12 months	8 hours
More than 12 months to 36 months	20 hours
More than 36 months	40 hours